

U.S. Patent Application Serial No. 09/869,325
Reply to Office Action of October 24, 2003

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Cancelled)

Claim 2 (Cancelled)

Claim 3 (Cancelled)

Claim 4 (Withdrawn) A sample temperature regulator comprising:

a heating block having a receptacle formed therein as a sample container holder, said heating block attaching a temperature-controllable heater; and

a cooling block having a cooling mechanism; the heating block and the cooling block being combined directly with each other;

wherein the cooling block is made of a material having a thermal conductivity lower than that of the heating block.

Claim 5 (Withdrawn): The sample temperature regulator according to claim 4, wherein the cooling block extends between and connects with a plurality of heating blocks.

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Claim 6 (Withdrawn): The sample temperature regulator according to claim 4 or 5,
further comprising a refluxing block extending between said cooling block, and containing means
for contacting an upper part of a sample container

Claim 7 (Previously Presented): A sample temperature regulator comprising:
a heating block having a sample container holder and a temperature-controllable heater;
a cooling block having a cooling mechanism; and
a connecting plate for combining the heating block and the cooling block with each other;
wherein the connecting plate is made of a material having a thermal conductivity lower than
those of these two blocks; and
a refluxing block which is brought into contact with an upper port of a sample container.

Claim 8 (Previously Presented): The sample temperature regulator according to claim 7,
wherein the cooling block is combined with a plurality of heating blocks.

Claim 9 (New): The sample temperature regulator according to claim 7, wherein the heating
block has a temperature sensor.

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Claim 10 (New): A sample temperature regulator comprising:

a heating block having a holding hole for holding a sample container on the upper surface thereof;

a cooling block having a cooling mechanism; and

a connecting plate made of a material having a thermal conductivity lower than those of these two blocks;

wherein the cooling block is in the form of a square column;

a side face of the heating block is connected with a longitudinal side face of the cooling block through the connecting plate, a cartridge heater plugged into a socket formed in the heating block, and a cartridge sensor being plugged into a socket defined in the heating block;

and the heater and the sensor are connected to a temperature controller, so that the controller can control the temperature of the heater based on the temperature detected by the sensor.

Claim 11 (New): A sample temperature regulator comprising:

a plurality of heating blocks each having a holding hole for holding a sample container on the upper surface thereof;

a cooling block having a cooling mechanism; and

a plurality of connecting plates made of a material having a thermal conductivity lower than those of the blocks;

wherein a face of each heating block is respectively connected with a face of the cooling block through each connecting plate, each heating block being equipped with a heater on a face

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opposite to the face where the cooling block is connected, and a temperature sensor;
and the heater and the sensor are connected to a temperature controller, so that the controller
can control the temperature of the heater based on the temperature detected by the sensor.

Claim 12 (New): A sample temperature regulator as claimed in claim 11, wherein the
cooling block is in the form of a square column;

wherein a side face of each heating block is respectively connected with a longitudinal side
face of the cooling block through each connecting plate; and

wherein the sensor is in the form of a temperature-detecting cartridge sensor inserted into a
socket for attachment.

Claim 13 (New): A sample temperature regulator comprising:

a plurality of heating blocks each having a holding hole for holding a sample container on
the upper surface thereof;

a cooling block having cooling mechanism; and

a plurality of connecting plates made of a material having a thermal conductivity lower than
those of the blocks;

wherein a face of each heating block is respectively connected with a face of the cooling
block through each connecting plate, a cartridge heater being plugged into a socket formed in the
heating block, and a sensor;

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and the heater and the sensor are connected to a temperature controller, so that the controller can control the temperature of the heater based on the temperature detected by the sensor.

Claim 14 (New): A sample temperature regulator as claimed in claim 13, wherein the sensor is plugged into a socket defined in each heating block.

Claim 15 (New): A sample temperature regulator according to any preceding claim, wherein the cooling block is provided with a plurality of refluxing blocks, one of them for each heating block, wherein each refluxing block contains a prop removably set to stand on the cooling block and an arm protruding from the top of the prop above the heating block to be brought into contact with the upper part of the sample container.

Claim 16 (New): A sample temperature regulator according to claim 15, wherein the cooling mechanism is comprised of a circulating passage containing a refrigerant channel defined longitudinally through the cooling block;

an antifreeze cooling unit; a pipe connecting the antifreeze cooling unit to an inlet of the refrigerant channel through a circulating pump; and

a pipe connecting an outlet of the refrigerant channel to the antifreeze cooling unit.

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Claim 17 (New): A sample temperature regulator according to any of claims 11 to 14, wherein the cooling mechanism is comprised of a circulating passage containing a metal pipe with a closed end fitted in a through hole formed in the longitudinal direction in the cooling block; a refrigerant injecting pipe inserted into the metal pipe through its opening to the closed end of the pipe; a vapor refrigerant cooling unit; a pipe connecting the vapor refrigerant cooling unit to the refrigerant injecting pipe; and a pipe connecting the opening of the metal pipe to the vapor refrigerant cooling unit.

Claim 18 (New): A sample temperature regulator according to any of claims 11 to 14, wherein the cooling mechanism contains a refrigerant channel defined longitudinally through the cooling block; a low-temperature vapor refrigerant generator; a pipe connecting a heating section of the low-temperature vapor refrigerant generator to an inlet of the refrigerant channel; and an exhaust pipe connected to an outlet of the refrigerant channel.

Claim 19 (New): A sample temperature regulator according to any of claims 11 to 14, wherein the cooling mechanism is a Peltier device connected to the side of the cooling block, formed as a solid body, opposite to the side attaching to the heating block, and the Peltier device is connected to the cooling block with a cooling side which performs cooling by energization.